



Project No.: TM-2212000124P  
Report No.: TMWK2212005128KS

FCC ID: 2AQ8A-EKSD7X1S

Page 1 / 14  
Rev.: 03

# RF Exposure Evaluation Report

**FCC 47 CFR § 2.1091**

for

**Enkore Smart Semi-Auto Electronic Deadbolt**

**Model Name.: EKS-D7P1S, EKS-D791S**

Prepared for:

**Pamex Inc.**

**4680 Vinita Court, Chino, CA, 91710, United States**

Prepared by

**Compliance Certification Services Inc.**

**Wugu Laboratory**

**No.11, Wugong 6th Rd., Wugu Dist.,**

**New Taipei City, Taiwan.**

**Issue Date: February 16, 2023**

**Note: This document may be altered or revised by Compliance Certification Services Inc. personnel only, and shall be noted in the revision section of the document. The client should not use it to claim product endorsement by TAF, NIST or any government agencies. The test results in the report only apply to the tested sample.**

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

除非另有說明，此報告結果僅對測試之樣品負責，同時此樣品僅保留90天。本報告未經本公司書面許可，不可部份複製。

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <http://www.sgs.com.tw/Terms-and-Conditions> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <http://www.sgs.com.tw/Terms-and-Conditions>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of client's instruction, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced, except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.



Report No.: TMWK2212005128KS

Page 2 / 14

Rev.: 03

## Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	January 19, 2023	Initial Issue	ALL	Doris Chu
01	February 4, 2023	See the following Note Rev. (01)	P.7, P.12	Doris Chu
02	February 14, 2023	See the following Note Rev. (02)	P.7, P.12	Doris Chu
03	February 16, 2023	See the following Note Rev. (03)	P.12	Doris Chu

Rev. (01)

1. Modify NFC Result Power 3m to 30m in section 3.2.
2. Modify NFC test result in section 5.

Rev. (02)

1. Modify BLE Maximum tune up power in section 3.2 and 5.

Rev. (03)

1. Modify BLE Frequency in section 5.



Report No.: TMWK2212005128KS

Page 3 / 14  
Rev.: 03

## Table of Contents

<b>1</b>	<b>ATTESTATION OF TEST RESULTS .....</b>	<b>4</b>
<b>2</b>	<b>TEST SPECIFICATION, METHODS AND PROCEDURES .....</b>	<b>5</b>
<b>3</b>	<b>DEVICE UNDER TEST (DUT) INFORMATION .....</b>	<b>6</b>
3.1	DUT DESCRIPTION .....	6
3.2	WIRELESS TECHNOLOGIES .....	7
<b>4</b>	<b>MAXIMUM PERMISSIBLE EXPOSURE .....</b>	<b>8</b>
4.1	LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE) .....	8
4.2	MPE CALCULATION METHOD .....	9
4.3	MPE EXEMPTION .....	10
4.4	MULTIPLE RF SOURCES .....	11
<b>5</b>	<b>RADIO FREQUENCY RADIATION MAX EXPOSURE EVALUATION .....</b>	<b>12</b>
<b>6</b>	<b>SIMULTANEOUS TRANSMISSION ANALYSIS .....</b>	<b>13</b>
6.1	SUM OF THE WIFI 2.4GHZ & BLUETOOTH & NFC .....	13
<b>7</b>	<b>FACILITIES .....</b>	<b>14</b>



Report No.: TMWK2212005128KS

Page 4 / 14  
Rev.: 03

## 1 Attestation of Test Results

Applicant Name	Pamex Inc.
Model Name	EKS-D7P1S;EKS-D791S
Applicable Standards	FCC 47 CFR § 2.1091 KDB 447498 D04 FCC 47 CFR § 1.1307 FCC 47 CFR § 1.1310 Published RF exposure KDB procedures
Receive EUT Date:	December 9, 2022
<p>Compliance Certification Services Inc. , tested the above equipment in accordance with the requirements set forth in the above standards. Determination of compliance is based on the results of the compliance measurement,not taking into account measurement instrumentation uncertainty.All indications of Pass/Fail in this report are opinions expressed by Compliance Certification Services Inc, based on interpretations and/or observations of test results. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.</p>	
<p>Approved &amp; Released By:</p> 	
<p>Sky Zhou Asst. Section Manager Compliance Certification Services Inc.</p>	



Report No.: TMWK2212005128KS

Page 5 / 14

Rev.: 03

## 2 Test Specification, Methods and Procedures

The tests documented in this report were performed in accordance with FCC 47 CFR § 2.1091, the following FCC Published RF exposure [KDB](#) procedures:

- 447498 D04 Interim General RF Exposure Guidance v01
- 865664 D02 RF Exposure Reporting v01r02



Report No.: TMWK2212005128KS

Page 6 / 14  
Rev.: 03

### 3 Device Under Test (DUT) Information

#### 3.1 DUT Description

Product	Enkore Smart Semi-Auto Electronic Deadbolt
Trade Name	Pamex
Model No.	EKS-D7P1S, EKS-D791S
Model Discrepancy	EKS-D7P1S: Nickel Plating EKS-D791S: Black Plating
Hardware Version	V0.0.6
Software Version	NFC & WIFI: 000007 BT: 000011_00.03.01_00.01.01
Sample Stage	Identical prototype

### 3.2 Wireless Technologies

Frequency bands	<input checked="" type="checkbox"/> Bluetooth: 2402MHz-2480MHz <input checked="" type="checkbox"/> 802.11b/g/n HT20: 2412MHz ~ 2462 MHz <input checked="" type="checkbox"/> 802.11n HT40: 2422MHz ~ 2452 MHz <input checked="" type="checkbox"/> NFC: 13.56 Mhz <input type="checkbox"/> Others																				
Exposure classification	<input type="checkbox"/> Occupational/Controlled exposure (S = 5mW/cm2) <input checked="" type="checkbox"/> General Population/Uncontrolled exposure (S=1mW/cm2)																				
Antenna Specification	WIFI 2.4GHz: Chip Antenna Gain: 2.17 dBi  BLE: PCB Antenna Gain: 3.3 dBi  NFC: Loop PCB Antenna  2.4GHz:    Gain :        2.17 dBi    (Numeric gain: 1.65)        Worst BLE        Gain :        3.30 dBi    (Numeric gain: 2.14)        Worst																				
Maximum tune up power	<table><tr><td>BLE</td><td>2.00 dBm</td><td>(1.58 mW)</td></tr><tr><td>2.4GHz</td><td></td><td></td></tr><tr><td>IEEE 802.11b Mode:</td><td>11.50 dBm</td><td>(14.13 mW)</td></tr><tr><td>IEEE 802.11g Mode:</td><td>16.00 dBm</td><td>(39.81 mW)</td></tr><tr><td>IEEE 802.11n HT 20 Mode:</td><td>15.00 dBm</td><td>(31.62 mW)</td></tr><tr><td>IEEE 802.11n HT 40 Mode:</td><td>17.00 dBm</td><td>(50.12 mW)</td></tr></table>			BLE	2.00 dBm	(1.58 mW)	2.4GHz			IEEE 802.11b Mode:	11.50 dBm	(14.13 mW)	IEEE 802.11g Mode:	16.00 dBm	(39.81 mW)	IEEE 802.11n HT 20 Mode:	15.00 dBm	(31.62 mW)	IEEE 802.11n HT 40 Mode:	17.00 dBm	(50.12 mW)
BLE	2.00 dBm	(1.58 mW)																			
2.4GHz																					
IEEE 802.11b Mode:	11.50 dBm	(14.13 mW)																			
IEEE 802.11g Mode:	16.00 dBm	(39.81 mW)																			
IEEE 802.11n HT 20 Mode:	15.00 dBm	(31.62 mW)																			
IEEE 802.11n HT 40 Mode:	17.00 dBm	(50.12 mW)																			
NFC Result Power	13.56MHz        21.07 dBuV/m (30m)																				

#### Notes:

- For more details, please refer to the User's manual of the EUT.
- Disclaimer: Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.
- Disclaimer The variant model numbers / trademarks are assessed as identical in hardware and software to each other, hence all variants are fully covered by the test results in this test report without further verification test.
- The tune up power referred the AVG power of the test report TMWK2212005122KR, TMWK2212005126KR and TMWK2212005127KR for RF Exposure assessment purpose.

## 4 Maximum Permissible Exposure

### 4.1 Limits for Maximum Permissible Exposure (MPE)

**Table 1 - Limits for Maximum Permissible Exposure (MPE)**

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm <sup>2</sup> )	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	* 100	6
3.0-30	1842/f	4.89/f	* 900/f <sup>2</sup>	6
30-300	61.4	0.163	1.0	6
300-1,500			f/300	6
1,500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	* 100	30
1.34-30	824/f	2.19/f	* 180/f <sup>2</sup>	30
30-300	27.5	0.073	0.2	30
300-1,500			f/1500	30
<b><u>1,500-100,000</u></b>			1.0	30



## 4.2 MPE Calculation Method

### Calculation

Given  $E = \frac{\sqrt{30 \times P \times G}}{d}$  &  $S = \frac{E^2}{377}$

Where E = Field strength in Volts / meter

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power density in milliwatts / square centimeter

Combining equations and re-arranging the terms to express the distance as a function of the remaining variables yields:

$$S = \frac{30 \times P \times G}{377 d^2}$$

Changing to units of mW and cm, using:

$$P \text{ (mW)} = P \text{ (W)} / 1000 \text{ and}$$

$$d \text{ (cm)} = d \text{ (m)} / 100$$

Yields

$$S = \frac{30 \times (P/1000) \times G}{377 \times (d/100)^2} = 0.0796 \times \frac{P \times G}{d^2} \text{ Equation 1}$$

Where d = Distance in cm

P = Power in mW

G = Numeric antenna gain

S = Power density in mW / cm<sup>2</sup>

If, Substituting the MPE safe distance using d = 20 cm into Equation 1:

$$S = 0.000199 \times P \times G$$

### 4.3 MPE EXEMPTION

- (A) The available maximum time-averaged power is no more than 1 mW
- (B) The available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold  $P_{th}$  (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive).  $P_{th}$  is given by:

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where

$$x = -\log_{10} \left( \frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

$d$  = the separation distance (cm);

- (C) Using Table 1 and the minimum separation distance ( $R$  in meters) from the body of a nearby person for the frequency ( $f$  in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply,  $R$  must be at least  $\lambda/2\pi$ , where  $\lambda$  is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of  $\lambda/4$  or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

Single RF Sources Subject to Routine Environmental Evaluation	
RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	$1,920 R^2$ .
1.34-30	$3,450 R^2/f^2$ .
30-300	$3.83 R^2$ .
300-1,500	$0.0128 R^2 f$ .
1,500-100,000	$19.2 R^2$ .
Note: $R$ is in meters, $f$ is in MHz.	

#### 4.4 Multiple RF sources

In the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation),

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k} \leq 1$$

## 5 Radio Frequency Radiation Max Exposure Evaluation

Substituting the MPE safe distance using  $d = 20$  cm into Equation 1:

$$S = 0.000199 \times P \times G$$

Where  $P$  = Power in mW

$G$  = Numeric antenna gain

$S$  = Power density in mW / cm<sup>2</sup>

### Bluetooth

Mode	Frequency (MHz)	Max Tune-up power(dBm)	Max Tune-up power(mW)	G(dBi)	G(num.)	D(cm)	Power Density in mW/cm <sup>2</sup>	Power Density in mW/cm <sup>2</sup>
BLE	2440.00	2.00	1.58	3.30	2.14	20.0	0.001	1.000

### WIFI 2.4GHz

Mode	Frequency (MHz)	Max Tune-up power(dBm)	Max Tune-up power(mW)	G(dBi)	G(num.)	D(cm)	Power Density in mW/cm <sup>2</sup>	Power Density in mW/cm <sup>2</sup>
IEEE 802.11b	2462.00	11.50	14.13	2.17	1.65	20.0	0.005	1.000
IEEE 802.11g	2462.00	16.00	39.81	2.17	1.65	20.0	0.013	1.000
IEEE 802.11n HT 20	2462.00	15.00	31.62	2.17	1.65	20.0	0.010	1.000
IEEE 802.11n HT 40	2452.00	17.00	50.12	2.17	1.65	20.0	0.016	1.000

### NFC

Mode	Frequency (MHz)	Result power (dBuV/m)	Electric Field Strength (V/m)	Limit of Electric Field Strength (V/m)
NFC	13.56	21.07	0.00	60.77

### 6 Simultaneous Transmission Analysis

In the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation),

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure\ Limit_k} \leq 1$$

#### Simultaneous Transmission Condition

RF Exposure Condition	Item	Capable Transmit Configurations			
	1	DTS	+	BLE	+ NFC

#### 6.1 Sum of the WIFI 2.4GHZ & Bluetooth & NFC

Therefore, the worst-case situation is 0.016 / 1 + 0.001 / 1 + 0 / 60.77 = 0.017, which is less than “1”.



Report No.: TMWK2212005128KS

Page 14 / 14  
Rev.: 03

## 7 Facilities

All measurement facilities used to collect the measurement data are located at

☒ No.11, Wugong 6th Rd., Wugu Dist., New Taipei City, Taiwan.

☐ No. 12, Ln. 116, Wugong 3rd Rd., Wugu Dist., New Taipei City, Taiwan.

**END OF REPORT**